1,095,068

PATENT SPECIFICATION

DRAWINGS ATTACHED

1,095,068

Date of Application and filing Complete Specification: Nov. 29, 1965.

No. 18178/67.

Application made in Germany (No. M52975/67a Gbm) on Oct. 14, 1965.

(Divided out of No. 1,095,067.)

Complete Specification Published: Dec. 13, 1967.

Index at acceptance:—F2 U (2A1, 2A3A, 2A5); B3 D (1D1, 2A15, 2A17)

Int. Cl.:—F 16 d 3/14

COMPLETE SPECIFICATION

Improvements in Motor-Driven Grinders comprising Bevel Gearings

We, METABOWERKE KG CLOSS, RAUCH & SCHNIZLER, of Nürtingen, Württemberg, Germany, a Kommanditgesellschaft organised under the laws of Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to motor-driven grinders of the kind comprising a bevel gearing including a pinion and a crown wheel and a tool spindle.

Such grinders, particularly those of low power with electric motors and guided by hand, may be overloaded and brought to a halt by pressing the grinding disc excessively against the surface being ground. In such a case the motor becomes unduly heated and the winding may be burnt out.

The invention is therefore intended to provide simple means for avoiding damage due to overloading in a grinder of the kind referred to.

According to the invention a grinder of the kind referred to is provided with an overload slip coupling installed between the crown wheel and the tool spindle. Thus if the grinding disc is brought to a halt due to overloading the motor can continue to run and does not suffer undue damage.

The costs of providing the slip coupling can be kept small if the crown wheel is provided with a friction face and forms one part of the coupling.

Preferably the crown wheel is mounted for relative rotation on the tool spindle and a friction plate is pressed against the friction face on the crown wheel and is secured against relative rotation on the tool spindle. With this construction the coupling can be of small length and comprise only a few components.

The tool spindle made be formed with splines to engage the friction plate and the latter may be pressed against the crown wheel by a pack of dished springs arranged on the tool spindle between an abutment and the friction plate. In some circumstances a single dished spring suffices, or it may be possible to use several dished springs of different diameters, and the force exerted by the spring or springs can be varied by their sizes and material thickness and number.

It is desirable to maintain the torque transmissible between the crown wheel and the friction plate as constant as possible. If both the friction surfaces are smooth the dust due to abrasion when slipping occurs is not removed and remains between the friction surfaces and varies the co-efficient of friction and so leads to variation in the transmissible torque. The dust may also lead to scoring and rapid wear of the friction surfaces. So that large torques of substantially constant maximum values can be achieved with relatively small couplings it is preferred to provide the friction plate with channels on its face engaging the crown wheel to accommodate the dust so that the friction surfaces remain clean. Advantageously the channels are circular and produce annular friction surfaces of a maximum width of 1.5 mm. If the friction surfaces are suitably hardened the wear is practically nil and the torque transmissible by friction remains substantially constant.

So that the maximum torque transmissible by friction can be adjusted when the friction plate is pressed against the crown wheel by dished springs the latter may be arranged on the tool spindle between an abutment and the friction plate, the abutment being constituted by a nut which is screwable on the tool spindle for adjusting the pressure of the friction plate against the crown wheel.

The invention is illustrated by way of example in the accompanying drawing, in which:—

Figure 1 is an elevation in section of parts of a grinder embodying the invention, and

Figure 2 is a sectional detail view illustrating a modification.

The illustrated grinder comprises an electric motor 1 having a drive shaft 2 on which is a pinion 3 meshing with a crown wheel 12.

In a housing 4 a tool spindle 5 perpendicular to the shaft 2 is mounted by means of a plain bearing 6 and an anti-friction bearing 8 which is held in an intermediate part 7.

The tool spindle 5 carries a grinding disc 9 which is clamped between an abutment piece 10 and a clamping disc 11 screwed on to the spindle 5.

The crown wheel 12 is mounted for relative rotation on the spindle 5 and has a friction surface 13 against which is pressed a friction plate 14 which is secured against relative rotation on the spindle 5 by means of splines 15. The plate 14 has a friction surface 16 and is pressed against the crown wheel 12 by a pack of dished springs 17 arranged between an abutment 18 on the spindle 5 and the plate 14. Figure 1 shows the said abutment 18 constituted by a securing ring 19, whereas Figure 2 shows the said abutment 18 constituted by a nut 20 which is screwable on the spindle 5 for adjusting the pressure of the plate 14 against the crown wheel 12.

The friction surface 16 of the friction plate 14 is provided with concentric circular channels 21 which receive dust due to abrasion and thereby avoid scoring and maintain the maximum torque substantially constant.

If the grinding disc 9 should be pressed too hard against a workpiece and come to a halt, the spindle 5 is also halted but the coupling constituted by the plate 14 and the crown wheel 12 slips so that the crown wheel 12 and the motor 1 can continue to rotate. Thus damage to the motor is avoided. The maximum torque transmissible, determined by means of the springs 17, may be suited to the power of the motor so that the grinding disc is not halted by overloading until the maximum permissible loading of the motor 1 is just being reached.

WHAT WE CLAIM IS.—

1. A motor-driven grinder comprising a bevel gearing including a pinion and a crown wheel and a tool spindle, characterised in that an overload slip coupling is installed between the crown wheel and the tool spindle.

2. A grinder according to Claim 1, wherein the crown wheel is provided with a friction surface and forms one part of the coupling.

3. A grinder according to Claim 2, wherein the crown wheel is mounted for relative rotation on the tool spindle and a friction plate is pressed against the friction surface on the crown wheel and is secured against relative rotation on the tool spindle.

4. A grinder according to Claim 3, wherein the tool spindle is formed with splines to engage the friction plate.

5. A grinder according to Claim 3 or 4, wherein the friction plate is provided with channels in its face engaging the crown wheel.

6. A grinder according to Claim 5, wherein the channels are circular and produce annular friction surfaces of a maximum width of 1.5 mm.

7. A grinder according to any of Claims 3 to 6, wherein the friction plate is pressed against the crown wheel by a pack of dished springs arranged on the tool spindle between an abutment and the friction plate.

8. A grinder according to Claim 7, wherein the abutment is constituted by a securing ring.

9. A grinder according to Claim 7, wherein the abutment is constituted by a nut which is screwable on the tool spindle for adjusting the pressure of the friction plate against the crown wheel.

10. A motor-driven grinder comprising a bevel gearing including a pinion and a crown wheel and a tool spindle and an overload slip coupling substantially as hereinbefore described with reference to and as illustrated in Figure 1 or Figure 2 of the accompanying drawing.

HANS & DANIELSSON,
Chartered Patent Agents,
32, Lodge Lane,
London, N.12.

Leamington Spa: Printed for Her Majesty's Stationery Office, by the Courier Press.—1967. Published by The Patent Office, 25 Southampton Buildings, London, W.C.2. from which copies may be obtained.

Fig. 1

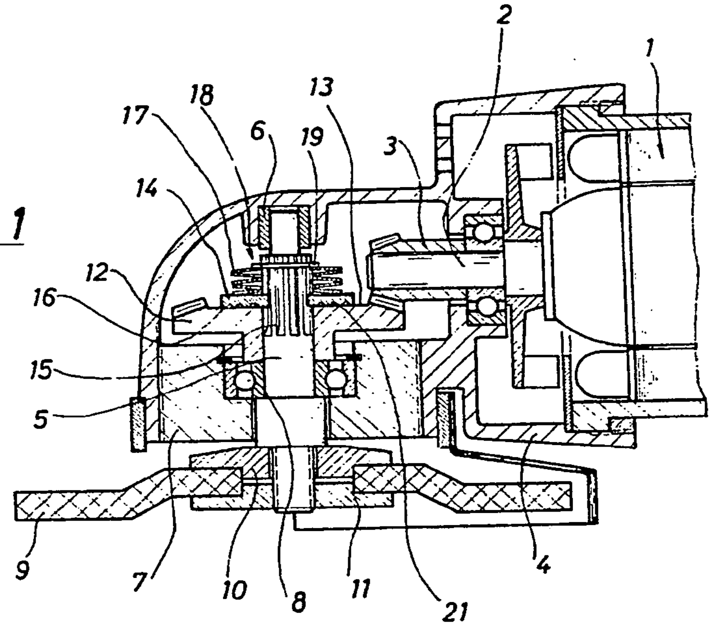

Fig. 2